PATENT
Docket No. 55797US015

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicant(s):	Colin MCCULLOUGH et al.	Group Art Unit:	1775
Serial No.:	10/730,182	Examiner:	Jason L. Savage
Confirmation No.:	2896		
Filed:	8 December 2003		
For:	ALUMINUM MATRIX COMPOSITE WIRE		

RESPONSE UNDER 37 C.F.R. §1.111

Commissioner for Patents
Mail Stop Amendment
P.O. Box 1450
Alexandria, VA 22313-1450

Dear Sir:

Remarks

The Office Action mailed 24 May 2004 has been received and reviewed. The pending claims are claims 45-48 and 50-54. Reconsideration and withdrawal of the rejections are respectfully requested.

Claim Objections

The Examiner objected to line 4 of claim 51, where applicant states "wire." The Examiner alleged that the claim is drawn to a cable, and there is no antecedent basis for the term "wire" in line 4. Applicants direct the Examiner's attention to line 1 of claim 51 that provides such antecedent basis ("A cable comprising at least one aluminum matrix composite wire . . . ").

The 35 U.S.C. §103 Rejection

The Examiner rejected claims 45-48 and 50-54 under 35 U.S.C. §103(a) as being unpatentable over Sowman (U.S. Patent No. 3,795,524).

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The Office Action states in part:

> Sowman teaches fibers, films, flakes, and microspheres of novel aluminum borate or aluminum borosilicate compositions (col. 1, ln. 13-24). Sowman teaches that aluminum borosilicate fibers can be made which are continuous in length, strong, glossy, having a high moduli of elasticity (col. 2, ln. 8-23). Sowman does not exemplify an embodiment wherein the continuous fibers are disposed in an aluminum matrix; however, it does teach that the continuous fibers may be advantageously used in metal matrix composites including aluminum matrix composites . . . It would have been obvious to one of ordinary skill in the art at the time the invention was made to have used the continuous fibers of Sowman in an aluminum matrix composite since it is specifically stated as a suitable use by the reference.
>
> Regarding the limitation that the aluminum matrix composite be a wire or a cable, Applicant has not defined what is meant by wire or cable. Sowman teaches that the fibers may be formed into a continuous strand, tow, yarn or other multifiber article (col. 2, ln. 47-64). A continuous strand coated with aluminum matrix metal taught by Sowman would meet the limitation of being a wire or cable. It would have been obvious to one of ordinary skill in the art at the time the invention was made to have used the aluminum matrix metal on a fibrous tow in order to help keep the fibers in the tow bonded together.

According to MPEP 2142, to establish a case of *prima facie* obviousness, three basic criteria must be met: 1) there must be some suggestion or motivation, either in the references or generally known to one of skill in the art, to modify or combine the reference teachings, 2) there must be reasonable expectation of success, and 3) the prior art references must teach or suggest all the claim limitations.

Applicants respectfully submit that the document cannot support a case of *prima facie* obviousness as to the claims because, among other possible reasons, the cited document does not motivate or suggest an aluminum matrix wire having a modulus of no greater than about 105 GPa (and, for claims 46 and 51, an average tensile strength of at least 350 MPa), or a cable that

includes such wire. Furthermore, there could be no reasonable expectation of success in obtaining an aluminum matrix composite wire having a modulus of no greater than about 105 GPa, at least because Sowman does not even address the modulus of the wire. Also, Sowman does not disclose all the elements of the present invention because it does not disclose a composite metal matrix wire having a modulus of no greater than about 105 GPa (and, for claims 46 and 51, an average tensile strength of at least 350 MPa), or a cable that includes such wire.

Although the Examiner suggests that the composite of Sowman would exhibit a modulus similar to those of the composites of the present invention, nothing in Sowman teaches or suggests this.

For example, the Examiner asserted that a strand coated with aluminum metal would be a wire or cable and have the recited properties. This is respectfully traversed. First of all, in response to the Examiner's assertion that Applicants have not defined wire or cable, one of skill in the art would clearly understand what is meant by a wire or cable. Second, there could be many interpretations of the teachings of Sowman. One such interpretation, for example, could be that an entire tow could have a metal sheath around it with significant void volume contained therein. If such were considered to be a wire or cable, it would not necessarily have the recited properties because of the presence of voids.

Furthermore, Sowman does not provide sufficient detail to teach one of skill in the art how to obtain the claimed wire or cable with the recited properties. And, at page 15, lines 23-31 of Applicants' specification, it is stated that:

> Because of the possibility of reaction between the fiber and matrix, it is preferred to process the wire at a sufficiently fast speed to minimize the occurrence of such reactions. For a particularly preferred embodiment, the submerged length of fiber, i.e., the length for which the fiber is in contact with molten aluminum is 23 centimeters (9 inches) and the speed to process the wire is at least about 76 centimeters/minute (30 inches/minute). It was found that speeds of 38 centimeters/minute (15 inches/minute) caused reaction between fiber and matrix, whereas 76 centimeters/minute (30 inches/minute) wire speed did not cause any reaction.

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The occurrence of such a reaction between the fiber and matrix affects various properties of the composite. Thus, even assuming *arguendo* it was obvious to try to coat the aluminum borosilicate fibers of Sowman with aluminum metal, it would not have been obvious that the claimed composite wire, and cable that includes such wire, would be obtained. Sowman fails to teach or properly suggest how to obtain aluminum matrix composite wire with the recited properties.

Applicants submit that the Examiner's line of reasoning is akin to an inherency argument, which is inapplicable in an obviousness rejection. Applicants' Representatives submit that for inherency to apply, the missing descriptive information must necessarily be present in the cited document such that one of skill in the art would recognize such a disclosure. "To establish inherency, the extrinsic evidence 'must make clean that the missing descriptive matter is necessarily present in the thing described in the reference, and that it would be so recognized by persons of ordinary skill'" (In re Robertson, 49 USPQ2d 1949 (Fed. Cir. 1999) quoting Continental Can Co. v. Monsanto Co., 20 USPQ2d 1746 (Fed. Cir. 1991)).

At least because of the reasons discussed above, there can be no recognition by one of skill in the art that the property of a modulus of no greater than about 105 GPa (and, for claims 46 and 51, an average tensile strength of at least about 350 MPa) is necessarily present. Inherency must be a necessary result, not merely a possible result. "Inherency . . . may not be established by probabilities or possibilities. The mere fact that a certain thing may result from a given set of circumstances is not sufficient." (In re Robertson, 49 USPQ2d 1949 (Fed. Cir. 1999) quoting In re Oelrich, 212 USPQ 323 (Fed. Cir. 1981)). Furthermore, an aluminum matrix composite wire having the recited modulus (and tensile strength for certain claims) is inherent only if there is at least a reasonable likelihood that one of skill in the art could have discovered or recognized it without specific guidance. That is, the subject matter relied upon must be disclosed in a manner to place it in possession of the public. (See, e.g., Akzo N.V. v. United States Int'l

Trade Comm'n, 1 USPQ2d 1241 (fed. Cir. 1986)). Clearly, this is not the situation with the document cited by the Examiner.

For these reasons, Applicants submit that the cited document will not support a §103(a) rejection of the claimed invention and request that the rejection be withdrawn.

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Summary

It is respectfully submitted that the pending claims 45-48 and 50-54 are in condition for allowance and notification to that effect is respectfully requested. The Examiner is invited to contact Applicants' Representatives, at the below-listed telephone number, if it is believed that prosecution of this application may be assisted thereby.

Respectfully submitted for
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June 23, 2004
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CERTIFICATE UNDER 37 CFR § 1.8:
The undersigned hereby certifies that the Transmittal Letter and the paper(s), as described hereinabove, are being transmitted by facsimile in accordance with 37 CFR §1.6(d) to the Patent and Trademark Office, addressed to Mail Stop Amendment, Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450, on this 23rd day of June, 2004, at 1:11 p.m. (Central Time).

By: [signature]
Name: [handwritten name]